

Development of Systems for Managing Small Innovation Enterprises

N. A. Lukasheva, A. E. Gorokhova, V. D. Sekerin, S. V. Bank, N. V. Gayduk

Abstract: *There are several factors that may augment the differentiation of innovation activity by small innovation enterprises today, which include the following: the choice of different lines of activity, an orientation toward different market niches, and differences in the degree to which a firm is engaged in long-term research. This paper brings forward a method for determining the useful effect depending on the type of organization of activity by small innovation enterprises.*

Index Terms: *small innovation enterprises; structure of a small innovation enterprise; differentiation of the types of innovation activity; a nation's economic development; the state's innovation policy.*

I. INTRODUCTION

Currently, Russia's sector of small innovation enterprises (SIE) is developing upon the basis of publicly-funded research and educational organizations, whilst in developed countries the majority of small and medium-sized innovation enterprises are formed around high-tech companies [1, 2]. The development of high technology in SIEs has been given a significant amount of attention nowadays, which reflects the relevance of research in the area, as well as the great potential of utilizing cutting-edge technology to foster further the prosperity of developed and developing economies [3]. Meanwhile, economic development around the globe is creating the conditions for closer cooperation between SIEs and industrial companies. The key purpose behind the objective assessment of SIEs' contribution to the Russian economy is governed by the need to implement the overdue shift away from the use of artificial indicators in the study of real effects. Common to SIEs focused on the conduct of scientific-technical activity is an orientation toward the resolution of issues that form part of the production objective in many areas of production. Specializing in one particular or several types of production processes is quite common among SIEs and is a natural way to commercialize the product of intellectual activity (PIA). It is normally quite hard to organize work for commercializing a particular PIA the

rights to the use thereof have been transferred to a SIE. The outcomes of implementing innovations enable companies to gain significant competitive advantage, which is a significant stimulus for them [4]. It is SIEs that should play a deciding role in bringing about technological change, as they offer many benefits as sources of innovation [5].

Pursuant to Federal Law No. 217-FZ, which covers the creation of economic societies (SIE) by publicly-funded research and educational institutions [6], the founding organization transfers as a property deposit the rights to the use of the PIA, which, based on an assessment by a SIE's founders and administration, must serve as the basis for the conduct of innovation activity and generation of products and services. This condition has been incorporated into the Tax Code of the Russian Federation as a basis for the use of lower insurance rates. The economic effect from PIA commercialization is placed, as a part of payment for those results, at the disposal of the founding organization or its SIE. In this regard, the properties of the PIA transferred can, theoretically, be employed in grouping the types of SIE activity.

II. METHODS

The methodology for resolving the study's objectives is based on exploring the internal structure of the SIE sector, which requires selecting enterprises' essential characteristics, formalizing them, and adopting an optimum policy in respect of the various groups of SIEs. The information basis for implementing the authors' adopted methodology is grounded in data from a registry of notifications on the creation of economic societies and economic partnerships (SIEs) (<https://mip.extech.ru>), data from questionnaire-based surveys of registered enterprises, and data from the monitoring of founding organizations which created the SIE network. The study owes its relevance to the need to resolve the issue of organizing effective innovation activity by SIEs via the development and application of new mechanisms for managing SIE activity by reference to the existing diversity of SIEs, creation of methods for grouping them by degree of impact on Russia's economic development, and introduction of differentiated measures of government support in accordance with the effect expected from their activity in the form of development of innovations in Russia. Taking a differentiated approach to SIEs should help achieve positive results at least cost to the state, as it will help concentrate financial support on a group of the most promising enterprises.

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Development of Systems for Managing Small Innovation Enterprises

III. RESULTS

In analyzing the results of SIE activity, the authors explored a set of factors that are conducive to increased income differentiation among SIEs. The authors' surveys of SIE founder organizations and research into the conditions of

activity by SIEs based on materials from questionnaire-based surveys and on data on work performed by SIEs indicated the deciding significance of the market for the sale of products and services by SIEs. Table 1 distributes SIEs by type of activity depending on its orientation toward the consumer.

Table 1. Types of Activity by SIEs and Their Orientation toward Particular Needs

	Type of activity by SIEs	Number of enterprises				Average revenue, million rubles	
		Total:	including those oriented toward meeting particular needs				
			SIEs and publicly-funded research and educational organizations	External	External and internal	None	
1.	Engineering	10	3	3	3	1	20.9
2.	Innovative products	28	9	15	3	1	11.6
3.	Information technology	3	2	2	0	0	1.3
4.	Consulting	5	0	4	0	1	8.17
5.	R&D	68	45	13	1	9	44
6.	R&D and manufacture	9	5	2	2	0	52.5
7.	Organizational activities	7	5	2	0	0	8.6
8.	Production activity	19	3	16	0	0	54.4
9.	Product development and manufacture	19	5	11	0	3	26.7
10.	Scientific-technical services	15	4	10	1	0	29.2
	Total:	178	81	78	10	15	256.1

Most of the enterprises are oriented toward the conduct of R&D – either on commission from their founder or jointly with the founder on commission from a common client. This means that most enterprises have not reached a level of real innovation activity yet. For a portion of the enterprises this is a preparatory stage of an innovation project, but for most of the enterprises in this group this is their primary activity. In essence, this type of enterprises tends to remain a research lab. Production activity generates the greatest revenue and is oriented toward the open market, toward external consumers.

For the most part, it is activity related to client maintenance. The overall picture suggests that the biggest challenge in implementing innovation projects is the search for potential clients.

The state's policy on support for SIEs is predicated on the assumption that they will be engaged in the commercialization of a PIA obtained from the founder, but in practice only 12% of the enterprises under examination are engaged in that type of activity (see Figure 1).

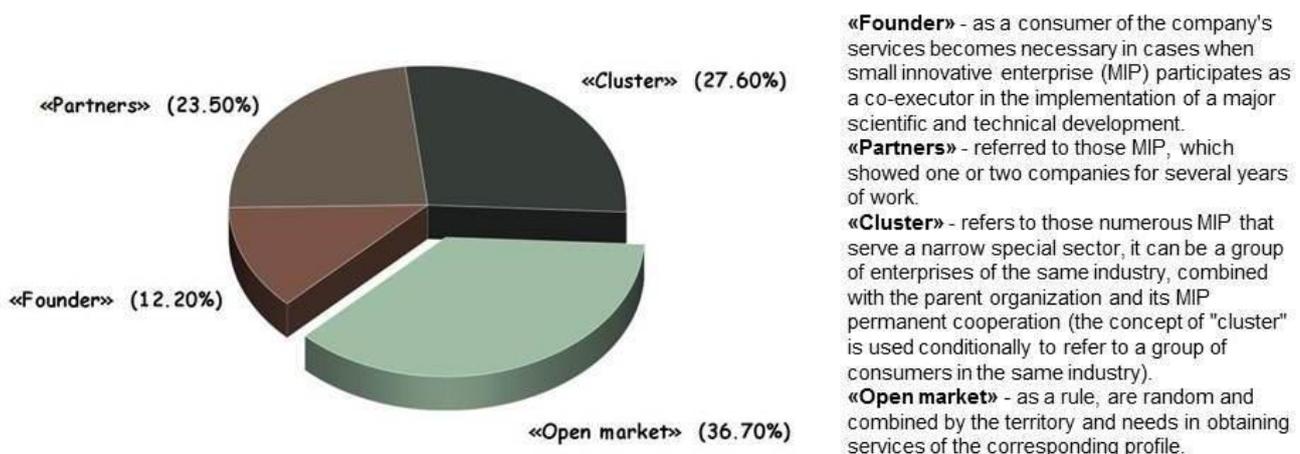


Fig. 1. The structure of the market for goods and services by SIEs.

Eventually, the authors managed to draw some conclusions about work performed by these institutions and their sustainable specialization and give an expert assessment to the market niche for their products and services. A total of four market niches were identified: Founder, Partners,

Cluster, and Open Market.



An analysis of market niches occupied by SIEs that helped generate the biggest revenue revealed that around 23% of all SIEs were oriented toward sustainable partners, while 27% were oriented toward clusters, which were a sustainable group of companies with similar technological needs. Enterprises from the real sector of the economy accounted for 60 to 100% of all revenue earned by top-earning SIEs [7]. Enterprises that are keen on undertaking innovation projects are faced with the most complicated economic situation [8]. Figure 2 displays the authors' grouping of SIEs by type of their activity.

As evidenced by Figure 2, one must acknowledge the diversity of forms of activity by SIEs and recognize the fact that only a small portion of existing SIEs are really engaged in innovation activity as one knows it classically, i.e. are focused on creating new innovative products based on rights of use obtained from a founding organization or PIAs turned out on their own.

The group termed 'Technologies' reflects most accurately the key objectives behind the creation of SIEs at

publicly-funded research and educational organizations. However, as was already noted above, existing economic conditions force SIEs to choose other types of activity and, accordingly, alter the institution's internal organization.

IV. METHODS

An analysis of work performed by SIEs indicates significant differences in the depth of R&D conducted based on which innovative products were turned out or services were provided.

A major portion of SIEs did not seek to create new innovative products but tended to enter the open market with a supply of scientific-technical services in the area of measurement, certification, and consulting and those related to the repair and maintenance of machinery and equipment.

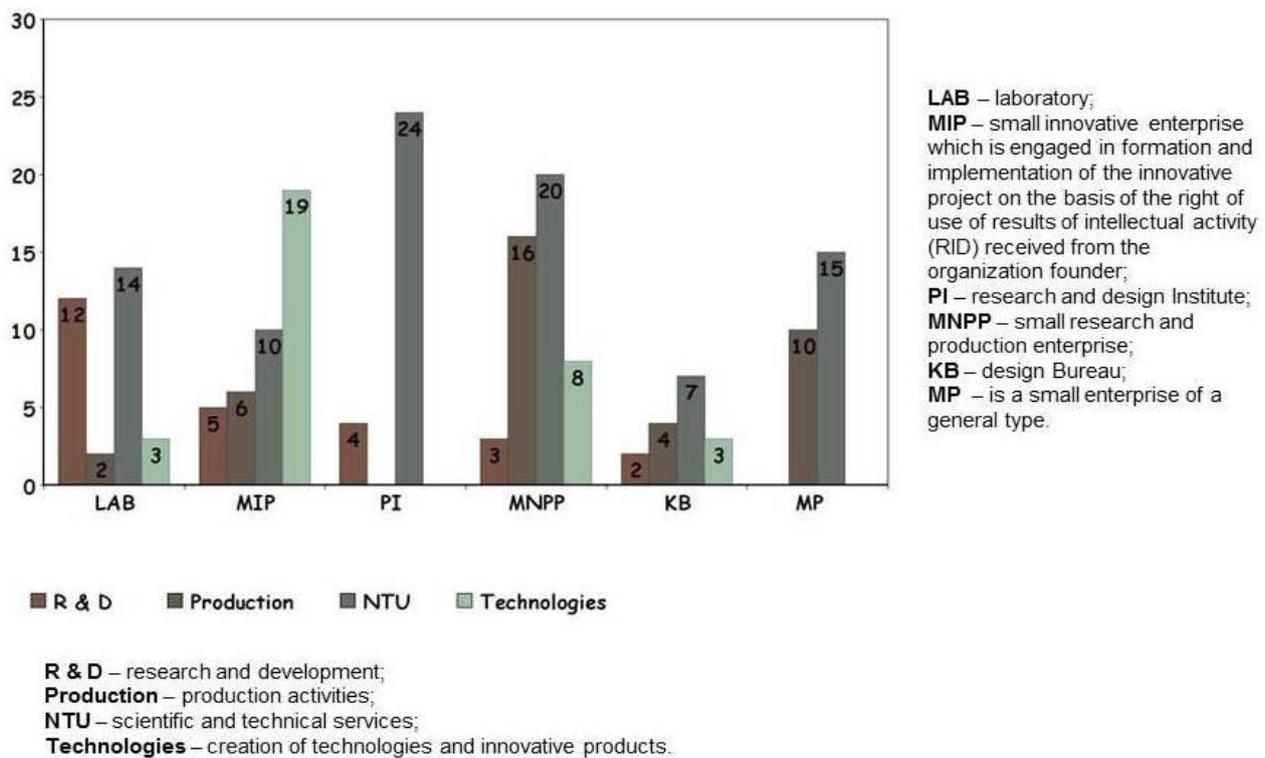


Fig. 2. Major types of SIEs and types of activity by them.

The utility of this type of activity lies in that without it, it is impossible to keep up a level of technology already achieved. The manufacture of finished products is often carried out based on technologies that exist already, and the utility of this type of activity lies in providing the market with all necessary resources. At higher level is the activity related to creating new technologies and products based on research conducted, which can perfectly be utilized to modernize production. Enterprises that really create new technologies are also characterized by two major levels of depth of development work. The deepest development work is based on applying the results of fundamental research conducted at the founding

organization with participation from an SIE team [9]. A key characteristic of this group of innovations lies in guaranteed diffusion into various sectors of the economy. Different levels of development work may require different forms of government support for SIEs. Subsidies are most advisable for the support of R&D conducted at the highest level, with a focus on ensuring a long-lasting effect of innovations on economic and technological development. Table 2 displays the authors' proposed grouping of SIEs by type of useful effect from their activity.

Development of Systems for Managing Small Innovation Enterprises

Table 2. Grouping SIEs by Type of Useful Effect from Their Activity

	Level of innovativeness	Distinctive features	Effect on the economy	Innovativeness effect
1.	Regular product	Fills the gaps in the market for goods and services	Helps better balance the demand and supply	No new economic effects with the consumer and with the state
2.	Enhanced product	Drives an existing product out of the marketplace	Helps boost economic results with the consumer	An effect for the consumer; there is no outside effect
3.	New resource	Implies the conduct of research and implementation of an innovation project	Enables the consumer to modernize production and change the product's quality while keeping the existing line of activity going	The emergence of a new resource produces an outside effect triggering upgrades at other enterprises
4.	Whole new technology	Changes the key principles of production	Triggers a wave of implementation in other sectors and production operations	Valuable outside effect
5.	Scientific discovery	Triggers similar R&D in other areas	Long-lasting positive effects in technology development	Strategic effect for the state

It is worth highlighting the idea of “the value of the research component in a project to be funded” and the idea of “a useful effect materializing in the economy as a result of the diffusion of an innovation”. Based on the above general idea, it suggested that policy on support for SIE activity be built based on the following principles:

1) The activity of SIEs is supported based on the existing regulatory framework, but there is a requirement to fulfill the conditions regarding the subject matter of the activity (the primary purpose of this support is to create in Russia an efficient SIE sector).

2) The state must provide support for R&D activities by SIEs which are facilitative of the diffusion of new technologies into the real sector of the economy.

3) In assessing innovation activity by SIEs, it may help to factor in useful effects achieving which is among the plans for fostering the nation's socio-economic development.

Based on the above principles, the authors suggest organizing differentiated support for SIE activity depending on the level of innovativeness of services and products by SIEs (see Table 3).

Table 3. Policy of Differentiated Support for Activity by SIEs

	Type of support	Conditions for getting the support	Support targeted toward SIEs with a certain innovativeness level
1.	Information	No conditions	All
2.	Tax concessions for SIEs	No conditions	3, 4, 5
3.	Investment from the Innovation Promotion Fund	Organization of one's own production	3, 4
4.	Shared funding support for R&D as part of special-purpose programs	Envisaged diffusion of innovations	4, 5
5.	Being entitled to receive state assignments for the conduct of R&D	Availability of fundamental results; possibility of those results being used in developing new technologies	5

Shared funding support for R&D as part of special-purpose programs (Table 3) implies the use of the state budget to fund applied R&D that is of special significance for the nation's economic development. Normally, this kind of research is supported in a centralized manner via special-purpose government programs. This area implies directing a portion of the funds from special-purpose programs toward funding R&D by SIEs, a mandatory condition being the entry of finished products into the open market [10]. That is, having an industrial partner alone is not enough, as it does not ensure

the diffusion of innovations and thus does not create a useful effect, which the government must partially fund as a beneficiary of the project.

V. CONCLUSION

The authors' analysis of key trends in the development of SIE activity suggests the need to pursue a more differentiated state policy on support for innovation activity by SIEs and build it on the economic basis of assessments of the useful effect which is created both by the actual fact of activity by SIEs and by projected diffusion of innovations created. In particular, it may be advisable to choose promising projects at an early stage and take appropriate measures to boost the likelihood of their successful completion.

REFERENCES

1. M. V. Safronov, Iu. A. Anishchenko, Malye innovatsionnye predpriyatiya: Formirovanie ponyatiinogo apparata [Small innovation enterprises: Putting together the conceptual apparatus], In Aktual'nye problemy aviatsii i kosmonavтики: Materialy VIII Vseros. nauch.-prakt. konf. tvorcheskoi molodezhi, posvyashchennoi 55-letiyu zapuska pervogo iskusstvennogo sputnika Zemli, 2, 2012, pp. 66–67.
2. M. Landabaso, Guest editorial on research and innovation strategies for smart specialization in Europe: Theory and practice of new innovation policy approaches, *European Journal of Innovation Management*, 17(4), 2014, pp. 378–389.
3. R. Oakey, A. J. Groen, G. Cook, P. C. van der Sijde, *New technology-based firms in the new millennium*, Bingley, UK: Emerald Group Publishing Limited, 2014.
4. R. M. Nizhegorodtsev, V. D. Sekerin, A. E. Gorokhova, N. P. Goridko, Features of innovation management strategies in the post-industrial economy, *Academy of Strategic Management Journal*, 16(2), 2017, pp. 1-8.
5. C. J. Isom, D. R. Jarczyk, *Innovations in small business: Drivers of change and value use*, 2009. Available: <https://www.sba.gov/sites/default/files/DriversofChange.pdf>
6. Federal'nyi zakon ot 02.08.2009 № 217-FZ (red. ot 29.12.2012) "O vnesenii izmenenii v otdel'nye zakonodatel'nye akty Rossiiskoi Federatsii po voprosam sozdaniya byudzhethnymi nauchnymi i obrazovatel'nymi uchrezhdeniyami khozyaistvennykh obshchestv v tselyakh prakticheskogo primeneniya (vnedreniya) rezul'tatov intellektual'noi deyatel'nosti" [Federal Law No. 217-FZ 'On Making Amendments to Particular Statutes of the Russian Federation on Issues Related to the Creation of Economic Societies by Publicly-funded Research and Educational Institutions for the Purpose of Practical Application (Implementation) of Products of Intellectual Activity' of August 2, 2009 (as amended on December 29, 2012)]. Available: <https://rg.ru/2009/08/04/int-dok.html>
7. Iu. N. Andreev, N. A. Lukasheva, *Monitoring vuzov kak instrument aktivnoi innovatsionnoi politiki* [College monitoring as a tool for pursuing a robust innovation policy], Moscow: FGBNU NII RINKTsE, *Innovatika i ekspertiza*, 1, 2018, pp. 22–39.
8. Iu. N. Andreev, N. A. Lukasheva, V. D. Sekerin, *Puti usileniya vzaimodeistviya malykh innovatsionnykh predpriyatii s promyshlennost'yu* [Ways to boost the interaction between small innovation enterprises and industry], Moscow: FGBNU NII RINKTsE, *Innovatika i ekspertiza*, 3, 2018, pp. 76–84.
9. M. Šikýř, V. Sekerin, A. Gorokhova, *Managing human resources using the best practice. Best fit approach*. *Journal of Applied Economic Sciences*, 13(1), 2018, pp. 113–122.
10. Iu. N. Andreev, N. A. Lukasheva, *Analiz vozdeistviya khozyaistvennykh obshchestv na tekhnologicheskoe razvitie otraslei ekonomiki* [An analysis of the effect of economic societies on the technological development of sectors within the economy], Moscow: FGBNU NII RINKTsE, *Innovatika i ekspertiza*, 2, 2017, pp. 115–128.